

A Revolution in Chart Recorders Advantages of the Master Thermometer

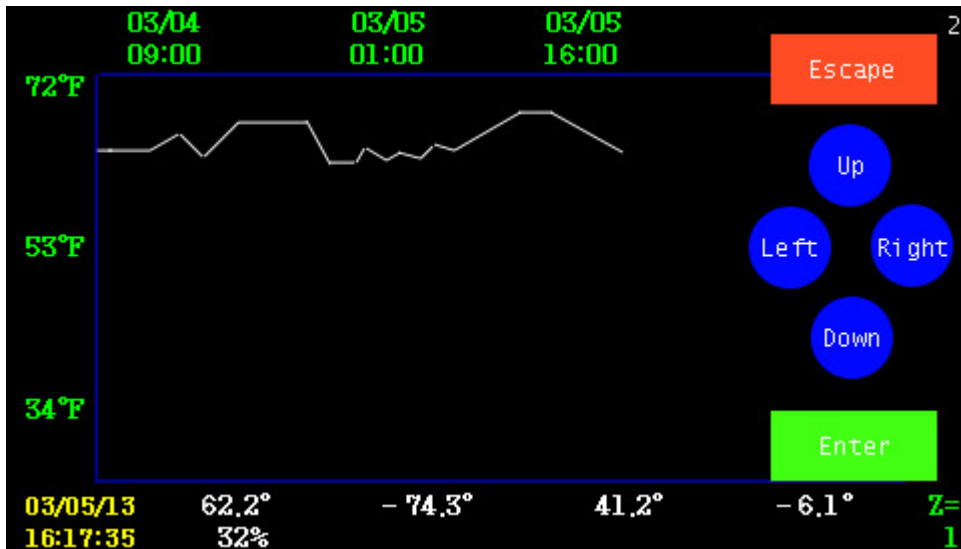


Revolution

The **Master Thermometer™** (A Paperless Chart Recorder) combines the best features of the chart recorder and the data logger and is becoming the preferred choice in the majority of new and retrofit temperature recording applications. An LCD-display replaces the old paper chart **and** offers the local display of the traditional paper chart recorder, while the non-volatile memory offers the electronic storage capabilities of a data logger. All in all, this precision instrument offers greater flexibility, lower cost and longer life than the old chart recorder. It puts simple-to-understand trend indications right on the display in a graphic format that can easily be seen and interpreted by even the most unskilled of workers. And if it is installed in a heavily trafficked area every employee becomes part of the quality control process as they glance at it while walking by. A computer interface allows the data to be downloaded periodically or automatically and saved as an encrypted data file for archiving and/or printing out.

No Pens, No Paper, No Mess!

Rather than paper charts that must be replaced frequently and can tear, smudge and jam, the Master Thermometer uses a high quality LCD display, and all-electronic circuitry. The LCD display not only shows the charts of a traditional paper recorder, but its flexibility also provides, a variety of trend information, alarm triggers, and an intuitive user interface for setup and operation.



Lower Cost.

Recent innovations in the **Master Thermometer™** have already brought the cost down to that of chart recorders, especially where multiple probes are used to monitor multiple sites. One Master Thermometer can do the work of four chart recorders in most cases. Since the Master Thermometer has no moving parts it will not jam or wear out so there is no repair or replacement costs. The user saves in three ways.

1. The initial purchase price is less than the mechanical chart recorder
2. There are no consumable supplies like paper and pens to purchase
3. It has no mechanical parts to wear out - making it basically maintenance free.

Stores a lot of data

The **Master Thermometer™** stores over 80,000 data points for each of its sensors. If it is set to sample and store temperature every 10 minutes it will store over 1.5 years of temperature history. If it is storing a reading every hour it will store many years of temperature history. Once the memory is full, new readings write over the oldest data. If the Master Thermometer is collecting temperature and relative humidity it store 44,000 points for each of the eight channels, (4 temp & 4 RH).

Multiple data displays

Because the logged data is displayed on the LCD, the chart can be electronically manipulated to highlight information that is important to the user. For example, in addition to scrolling back and forth along the data, it has a zoom feature that can redraw the chart to display weeks or even months of data on the screen at one time. And the trace mode can be used to highlight specific temperatures showing not only the exact temperature but also the hour, minute and second that the reading was taken right from the display itself.

Wider temperature range

Any temperatures that can be collected can be displayed on the **Master Thermometer™** LCD display. The only limiting factor is the type of probe used. If a K-type thermocouple is used, you could monitor -192°F liquid nitrogen for a week and then a 1500°F oven the next day. And because of the flexibility of the display it can be changed to highlight only the temperatures you are interested in. For the liquid nitrogen you might set the display parameters to show all the temperatures between -250°F and -120°F . For the 1500°F oven the range can be reset to show temperatures between 1300°F and 1650°F . The parameters can even be changed without losing the previously collected data.

Longer probe cables

Another very helpful feature of these instruments is the ability to position the sensors far away from the device itself. The wireless sensors have a range exceeding 100 feet clear-line-of-sight. Of course that distance is shorter if the sensors are used indoors. The wired sensors can be positioned even further away. This is possible because the cables carry only digital signals that are not as subject to noise interference or signal degradation over distance. Even if an analog sensor, such as a thermocouple or a thermistor, is used, the data is converted to a digital signal before it is sent to the display unit.

Data Downloading

The **Master Thermometer™** download software (TView) is open source and can be used to 'pull' collected data from the Master Thermometer on demand or set to automatically extract data on a regular basis. For instance, if set to auto-copy the data is written to a file on your computer every few seconds. The files themselves are to comply with 22CFR11.

Alarm Relay

The **Master Thermometer™** has a dry-contact N.O. (normally open) relay which is triggered if the collected temperature is outside the range of user set parameters. The alarm temperatures have a delay to avoid false alarms. For example, if a Master Thermometer is monitoring a 40°F refrigerator the alarm can be triggered if the temp is over 44°F for more than 30 minutes or below 35°F for more than 20 minutes.

Summary of Benefits

The **Master Thermometer™** has the following advantages:

1. Its remote probes can be positioned far away from the display.
2. It is easy to setup and begins collecting data immediately.
3. No programming or maintenance is required.
4. The simple chart display can be read by a 12 year old.
5. Multiple data displays: Zoom in/out; Scroll back & forth; trace mode.
6. It continues to collect data during a power outage.
7. It triggers a local alarm or phone dialer in emergencies.
8. It requires no maintenance or supplies (paper, pens, PC, chart changing).